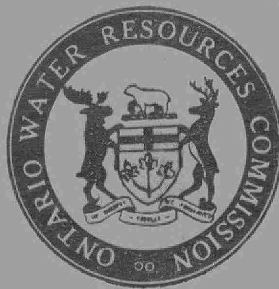


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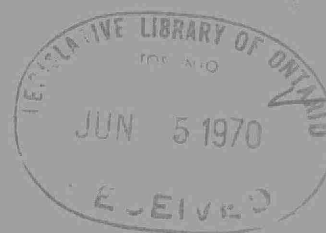
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THE

ONTARIO WATER RESOURCES

COMMISSION



WATER POLLUTION SURVEY

of the

TOWNSHIP OF LARDER LAKE

District Of Timiskaming

1969

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Report

on a

Water Pollution Survey

of the

TOWNSHIP OF LARDER LAKE

District of Timiskaming

January 1969

District Engineers Branch

Division of Sanitary Engineering

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R E P O R T

THE ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

A water pollution survey was made of the Township of Larder Lake in May and October, 1968. The purpose of the survey was to locate and record all significant sources of pollution within the townsite. Such surveys are performed routinely by the Ontario Water Resources Commission as a basis for evaluating all existing and potential sources of pollution. When sources of pollution are found, corrective action is requested by the Commission. Where water and/or pollution control works appear desirable or expansions to present facilities are necessary, the Commission has a programme to aid in the financing and construction of these works.

I GENERAL

Larder Lake Townsite, the centre of population in the Township, is situated on the north shore of Spoon Bay, a part of Larder Lake, on Highway No. 66 approximately 20 miles east of Kirkland Lake. Larder Lake had a 1967 assessed population of 1,385 (1968 Municipal Directory). The population of the community has dropped significantly in the past few years due to the decline of the mining industry in the area. There is no other major industry active in the townsite.

The topography of the land on which the townsite is situated is such that all drainage flows towards Larder Lake. An outcrop of rock extends southerly from Highway No. 66 towards the lake between Godfrey and Commissioner streets. This rock divides the townsite into two drainage areas. That to the east drains easterly and southerly directly to the lake, that to the west drains toward a tributary which flows through a low-lying area from the highway to the lake or bay. With the exception of the ridge on which the rock outcrops the townsite appears to have an overburden of clay.

The commercial development is mostly on Godfrey Street and the highway, and the majority of the population reside within the area from Commissioner Street eastward.

II WATER USES

(1) Municipal Water System

The water is obtained from a 75-foot drilled well 24 inches in diameter, and pumped to the distribution system. No treatment is provided. The water level in the well usually varies between 9 and 12 feet which is satisfactory.

It was noted that there is only one well for supply and no storage is provided on the system. In view of the apparent good supply capacity of the existing well, it has been recommended that a second well be constructed for standby.

(2) Recreational Uses

There are two public swimming beaches in the vicinity of the townsite. One is located on the shoreline of Spoon Bay near the foot of Seventh Avenue; the other, Raven Beach, is situated further east along the shoreline on the waters of Larder Lake.

III POLLUTION CONTROL

Sanitary Waste Disposal

The domestic sewage from approximately 50 percent of the population of the Townsite of Larder Lake is gravity fed to a primary treatment plant. The raw sewage passes through bar screens before entering the pumpwell where chlorination is applied by a gravity feed of hypochlorite solution. The sewage is then pumped to a rectangular sedimentation tank equipped with a mechanical sludge collector mechanism. The treatment plant effluent flows by gravity through the outfall sewer to Larder Lake. Settled sludge from the sedimentation tank is pumped to an unheated digester. The remaining 50 percent of the homes in the townsite are served by individual septic tanks. These tanks are provided free of charge to the homeowner by the townsite with only an installation fee to be paid. The efficiency of these tanks is very low and, in most cases, highly contaminated effluents discharge into Larder Lake via roadside ditches and a tributary.

IV PRESENTATION OF SAMPLE RESULTS

The laboratory results of the bacteriological examinations and chemical analyses of samples collected from the watercourses and outfalls are included in the table appended to this report. A description of the significance of the laboratory tests and water-quality objectives are also appended.

Samples collected from the drainage ditches and the tributary which contains effluents from private septic tanks and discharge to Larder Lake indicated that the 5-day biochemical oxygen demands and suspended solids concentrations were in excess of the OWRC objectives of 15 ppm for both analyses. Excessively high coliform counts were also evident.

The tributary, of satisfactory surface-water quality above the townsite, drains diagonally from north of Highway No. 66 near Manitoba Street across the west portion of the townsite to Larder Lake at the foot of Commissioner Street. This stream receives flows from drainage ditches in the area of Highway 66 south to Eighth Avenue and Ontario Street east to Commissioner Street.

The tributary, with indicated coliform counts ranging from 120,000 to 3,100,000 throughout the townsite area, is akin to an open sewer causing malodorous and unhealthy conditions. The drainage ditches along both sides of Second Avenue from Market Street eastward, which discharge directly to Larder Lake, also contribute to the above

conditions with a BOD value of 92 and a coliform count of 700,000.

Bacteriological sample results provided by the Timiskaming Health Unit for 1968 show one of the two public beaches on Larder Lake to have abnormally high coliform counts during the summer months. These results are undoubtedly influenced by the water pollution problems in the townsite. These results are listed below.

<u>Larder Lake Public Beach</u>			<u>Raven Beach</u>		
<u>Date</u>	<u>MPN</u>		<u>Date</u>	<u>MPN</u>	
	<u>Total Coliform Organisms</u>	<u>Faecal Coliform Organisms</u>		<u>Total Coliform Organisms</u>	<u>Faecal Coliform Organisms</u>
May 29	420	22	July 9	160	16
May 29	300	26	July 9	120	8
June 19	2,000	160	Aug. 16	20	4
June 19	7,600	4	Aug. 16	40	6
July 19	2,300	400	Aug. 22	160	0
July 19	5,000	1,400			
Aug. 7	20	4			
Aug. 7	75	8			
Aug. 16	3,300	400			
Aug. 16	2,700	110			
Aug. 22	640	2			
Aug. 22	360	18			

The amount of pollution, if any, in Larder Lake due to pleasure craft on the lake would be insignificant.

V DISCUSSION

Personnel of the works department of the Townsite of Larder Lake have been installing new septic tanks wherever necessary for the homeowner. Also they have placed half-pipe open culverts in the area of the septic tanks so as to relieve odour problems. The flow from

both the culverts and the septic tank outfalls discharge into the drainage ditches.

Due to the very undesirable conditions caused by the lack of sanitary sewers in the previously mentioned areas of the townsite, it should be apparent that the only solution is an extension of the present sewer system to include these areas. The clay over-burden of the townsite is not suitable for proper operation of septic tank systems.

Since there is no flow-measuring apparatus on the present primary sewage treatment plant, there are no records of sewage flow figures. Calculations show that the plant would appear to be more than capable of handling the additional flows from the remainder of the community that is not now serviced. The actual flow per capita could be well in excess of the estimate due to the age of the system with possible excessive infiltration. It is for this reason that some means of flow metering should be acquired so as to obtain a true set of flow figures. The most feasible method of implementing this practice would be to install time clocks on the raw sewage pumps.

Primary treatment alone will not provide the degree of treatment necessary to ensure satisfactory water quality in the beach areas, and therefore consideration should be given to providing secondary treatment.

VI REFUSE DISPOSAL

The refuse disposal site for Larder Lake Townsite is located near Larder Lake Station on the southeast shore of Pancake Lake approximately one mile north of the townsite. Garbage is dumped directly into the marshy area on the shore of the lake near the mouth of Pancake Creek which drains into Northwest Bay on Larder Lake. It is apparent that leachate from the refuse could gain access to the creek and thus to Larder Lake making the site a potential pollution source.

Therefore, consideration should be given to the relocation of the refuse disposal site.

VII COMMUNITY PLANNING

The township of Larder Lake should adopt an Official Plan through which council may establish and govern the future development of the township. Such a plan would provide for the passing of by-laws to regulate building and the use of land, and for providing suitable public services such as schools, parks, roads, and water and sewage works. Additions to the sewage works is required and some idea must be known by council as to when, where, and how these actions will be taken.

It is therefore recommended that council prepare and adopt an Official Plan, approved by the Minister of Municipal Affairs.

VIII SUMMARY AND CONCLUSIONS

A water pollution survey was conducted in the Township of Larder Lake in May and October, 1968.

The main pollution problem which remains in Larder Lake is in the western and northeastern areas of the townsite where the absence of sanitary sewers results in the discharge of inadequately treated sewage to the drainage ditches and a tributary and then to Larder Lake. The soil type within the municipality, consisting of a clay overburden, is not suitable for proper operation of septic tank systems.

Due to the northeastern flow of the lake water along the shore of the townsite, the domestic wastes discharging from the tributary undoubtedly impair the water quality at the public beach further along the shore, as shown by the bacteriological sample results.

Sanitary sewers only service approximately half of the population in the townsite. The remainder of the homes use septic tanks which cause significant pollution. The present primary sewage treatment plant appears to be quite capable of handling the flow of sewage from the entire townsite and therefore the sanitary sewers should be extended to include the unserviced areas.

Consideration should be given to providing secondary sewage treatment.

IX RECOMMENDATIONS

1. Municipal sanitary sewers should be extended to the unserviced areas in the west and northeast parts of the townsite.
2. In order to obtain true flow figures for the sewage treatment plant, timeclocks should be installed on the raw sewage pumps.
3. Consideration should be given to providing secondary sewage treatment.
4. Consideration should be given to the relocation of the townsite refuse disposal site.
5. The Township of Larder Lake should prepare and adopt an Official Plan, approved by the Minister of Municipal Affairs.

/elc

Prepared by:


J.D. Snider,
Civil Technologist,
Div. of Sanitary Engineering.

APPENDIX I

SIGNIFICANCE OF LABORATORY ANALYSES

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objectives for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Member (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indicated of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the

sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greater than 1.0 ppm.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed

20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

WATER POLLUTION SURVEY

TABLE 1

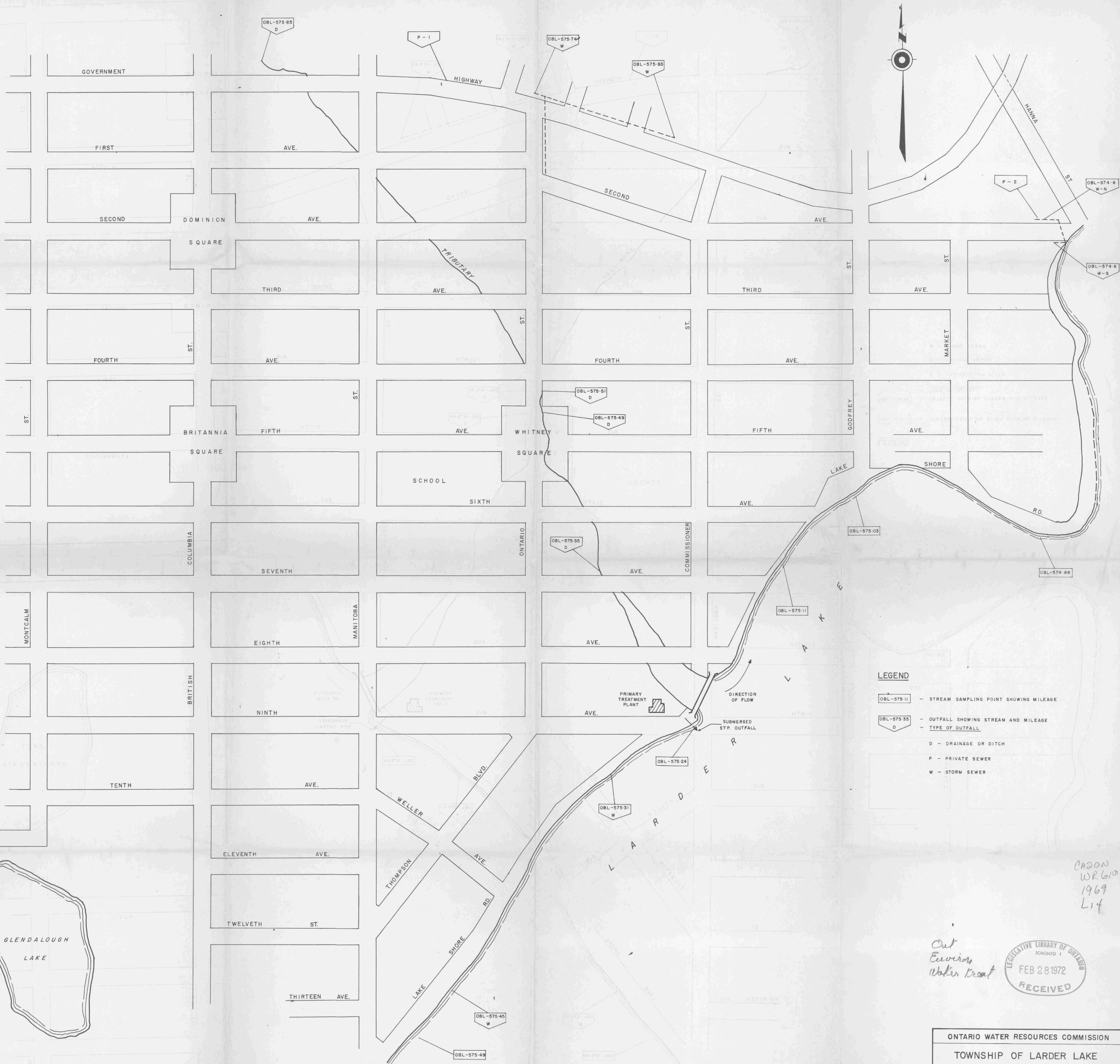
NO FLOW

TABLE 1 (CONTD)

SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY	SOLIDS			MPN		ESTIMATED FLOW (GPM)	COMMENTS
			BOD (PPM)	TOTAL (PPM)	SUSP. (PPM)	DISS. (PPM)	TOTAL COLIFORM ORGANISMS	FAECAL COLIFORM ORGANISMS		
OBL 575.31-W	STORM OUTFALL TO LARDER LAKE NORTHEAST OF DEPT. OF LANDS AND FORESTS DOCK.									NO FLOW
OBL 575.35-D	TRIBUTARY AT MOUTH TO LAKE AT 7TH AVENUE.	MAY 29/68	8.0	298	25	273	110,000+	110,000+		
		OCT. 9/68	2.4	164	22	142	3,100,000	600,000		
OBL 575.45-W	STORM OUTFALL TO LARDER LAKE.	MAY 29/68								NO FLOW
		OCT. 9/68								
OBL 575.49	LARDER LAKE AT DEPT. OF LANDS AND FORESTS DOCK.	MAY 29/68	2.3	164	9	155	110,000+	2,300		
		OCT. 9/68	0.8	126	3	123	400	400		
OBL 575.49-D	TRIBUTARY AT WHITNEY SQUARE BETWEEN 4TH AVENUE AND 5TH AVENUE.	MAY 29/68	8.8	312	17	295	110,000+	110,000+		
		OCT. 9/68	3.8	178	16	162	700,000	110,000		
OBL 575.51-D	DITCH DRAINING TO TRIB- UTARY AT ONTARIO STREET.	MAY 29/68	16	384	23	361	100,000+	110,000+		
		OCT. 9/68	13	312	34	278	300,000	120,000		
OBL 575.74-W	STORM OUTFALL NORTH OF HWY. 66 AT ONTARIO STREET.	MAY 29/68								
		OCT. 9/68	3.6	162	4	158	18,000	15,000		
OBL 575.83-W	STORM OUTFALL NORTH OF HWY. 66 WEST OF COMMISSIONER STREET (DRAINS INTO DITCH).	MAY 29/68								NO FLOW
		OCT. 9/68	92	302	36	266	17,000	14,000		

TABLE 1 (CONTD)

SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS			MPN		ESTIMATED FLOW (GPM)	COMMENTS
				TOTAL (PPM)	SUSP. (PPM)	DISS. (PPM)	TOTAL COLIFORM ORGANISMS	FAECAL COLIFORM ORGANISMS		
OBL 575.85-D	TRIBUTARY AT HWY. 66 UP- STREAM OF LARDER LAKE.	MAY 29/68	1.3	232	7	225				
		OCT. 9/68	0.8	158	7	151	30	0		
P-1	SEPTIC TANK EFFLUENT FROM HUSKY SERVICE STATION. DRAINS INTO DITCH OF NORTH SIDE OF HWY. 66.	OCT. 9/68	26	734	89	645	40,000	38,000		
P-2	SEPTIC TANK OUTFALL AT SAMPLING POINT OBL 574.6-W(N).	OCT. 9/68	44	390	46	344	200,000	18,000		



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ONTARIO WATER RESOURCES COMMISSION	
TOWNSHIP OF LARDER LAKE WATER POLLUTION SURVEY 1968	
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DRAWN BY: L. L. BROOME	DATE: NOVEMBER, 1968
CHECKED BY: J. S.	DRAWING No: 68-107



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